SCIENCE.

FRIDAY, JUNE 27, 1884.

COMMENT AND CRITICISM.

THE new and promising biological department of the University of Pennsylvania has issued a modest prospectus, announcing opportunities for special work, and courses of instruction in biology, open to both sexes. A high ground is taken in its simple 'aim,' which is avowed to be, "to encourage original research in biology by offering facilities to scientists engaged in investigation, and by giving instruction to advanced students prosecuting special work." Besides this principal function, "the department will further conduct the instruction of those students of biology . . . in a course leading to the degree of doctor of philosophy, and of those . . . who have elected the course preparatory to the study of medicine." A suitable laboratory is to be ready by Sept. 1, and is to possess one feature which cannot be too highly commended; viz., "private rooms for the use of investigators." There is as yet no symptom of any attempt to force investigation unduly, and let us hope there never will be. Investigators are born, not made; and now that the first step has been taken in promising them 'facilities,' the next will quickly follow; viz., to supply a stimulus. For this, example is better than any mechanical pressure; and to the faculty we must look for the healthy stimulus of example. Last, but by no means least, the university or its friends should see to it that a moderate pecuniary support shall be obtainable in the shape of fellowships or otherwise; so that poverty may never be permitted to interfere too far with the real investigator.

DURING the past two years, great interest has been manifested in the subject of the unification of time and longitudes the world over. In our own country, the universal adoption, in November last, of standard time according to a system of meridians distant from that of Greenwich by an exact number of hours, has led to results of great importance in the convenient arrangements and intercourse of ordinary life. Though not at all a matter of necessity, it is still desirable that this system of standard meridians, or some other, shall be adopted everywhere; and, in pursuance of an act of congress, the president of the United States has invited the principal nations concerned to send delegates to a time-convention, to meet at Washington next October, to deliberate upon the question of the adoption of such a prime or zero meridian. By far the greater part of all calculations in geography, astronomy, and geodesy, where a zero meridian is concerned, are, by common consent, referred to the meridian of the observatory at Greenwich, England; so that this meridian stands among the first proposed for universal adoption. The representatives of other governments, however, will undoubtedly have decided preferences for other meridians; and there is much to be said in favor of the adoption of one or another zero point of reference. The interest in this subject is plainly apparent from the fact that nearly all of the invited nations have appointed suitable delegates, whom our own commissioners will at an early date be expected to receive at Washington.

It goes without saying, that the learned men of other lands, thus convened, will expect to see our own nation represented by its highest order of talent, especially as the convention has been called by ourselves. And it is particularly desirable that our own commissioners shall be men of the greatest scientific authority in these matters; for, as the representatives from foreign countries are our guests, they will the more readily accept proposals from our commissioners, should these representatives prove competent to take a very prominent part in all the deliberations of the congress, as

scientific men of the first rank. It may also fairly be supposed that the French language will be more generally spoken by the delegates from all nations; and the necessity of a thorough acquaintance with the French and German languages ought to be duly weighed by those having power to make the appointments of the American commissioners. The power of appointment having been apparently delegated to the secretary of state, no sufficient reason is apparent why this officer, whose appointments to similar positions of responsibility have heretofore been excellent, should have transferred his prerogative, in part, to the secretaries of war and the navy, the former of whom has not yet, it is believed, made his own designation.

The time-convention act provides for the appointment of three commissioners. On general grounds, the appointment of President Barnard by Secretary Frelinghuysen himself is open to no objection; for he has long been interested in these matters, occupies a commanding position, is a scientific man of recognized ability, and has had, in addition, much practical experience in international conferences. His personal disability of extreme deafness ought, however, we think, to have excluded him from membership of the commission, as it will practically prevent his taking a leading and representative part in its deliberations. The second commissioner, already named by the secretary of the navy, is not open to any such objection: but he is practically unknown in science, outside of a limited circle in the United States; and, aside from his being at present on duty at the naval observatory, there is very little reason why he should have been selected for this responsible scientific appointment, rather than any other line-officer of the navy; and, besides, we are credibly informed that he speaks no language but English.

It remains to be seen what name the secretary of war will designate; and it is to be hoped that he may consider well the appointments already made, and add by his own the strongest possible name to the list of commissioners. Unless we mistake, he is not required to make the appointment from the army, but may select from the ranks of scientific men in general. Had Mr. Frelinghuysen asked the secretary of the treasury for a name, and had he designated the superintendent of the coast-survey to act as commissioner, we should have had an officer in all respects competent to represent the interests of the nation. Nor had any one the power to make a wiser appointment than lay in the way of the secretary of the navy, — to detail the superintendent of the 'Nautical almanac' for this service. This condition of affairs, in so far as the present appointment of the American commissioners is concerned, points to the advisability of additional legislation on the subject. Congress should at once supplement the commission by not less than two additional members, and stipulate that these be recommended to the president (as the original commission might well have been) by the president of the National academy of sciences; thus making the matter one in which the advice of the academy is sought by the government, and which, by its act of incorporation, the academy is required to give. The appropriation of a moderate sum to defray the necessary expenses attending the sessions and records of the deliberations of the convention, ought also to be granted. This, indeed, we understand, has already been proposed.

The call made by the Peabody museum for immediate funds for the continuation of its explorations in Ohio deserves to meet with a cordial response; and, were the valuable and novel results which are being secured by this exploration more widely known, there would be no doubt as to its success. Probably, for the first time in all the years that have passed since the Ohio mounds and earthworks have excited the curiosity of the people, a thoroughly scientific and exhaustive exploration is making of one locality. This is not merely to collect relics from the mounds, which has heretofore

so often been the single purpose of so-called exploration; nor is it carried out by sinking shafts in the centre of a mound, or cutting a ditch or two through it: but every foot of earth is removed, and the whole structure laid bare foot by foot. This mode of work has led to the discovery of singular and remarkable structures, not only in the mound and at the natural level of the surrounding land, but for six feet beneath this, to the underlying gravel-deposit. These operations have brought so many novel facts to light, that we have now the right to class all former mound-explorations in the Ohio valley as so superficial as to be scientifically worthless, until further thorough work on groups not yet destroyed shall give the means of comparison, and place the partial results that were formerly obtained in their proper relations.

The recent explorations have shown conclusively that the mounds and earthworks in various parts of the country were made at greatly different periods of time, and presumably by different peoples, even should it be ascertained that they all belonged to the great Mongoloid stock, of which our Indians probably represent more than one subdivision. This, however, is not yet proved; and the conclusions that have been drawn from time to time, that there has only been one people on this continent who made the earthworks of various kinds, are too hasty deductions from the present imperfect knowledge of our archeology. That some Indian tribes made mounds and earthworks and fortifications is not to be questioned, and that others did not is probably equally true; but this does not give us the right to throw overboard other facts tending to show that peoples of various stages of development, and, so far as craniological and artistic conclusions can be at present drawn, of distinct ethnical stocks, were also former inhabitants of this continent. One man will class all the past and present native inhabitants of all America, both north and south, as Indians; the next, with equal assurance, will state that the ancient Mexicans, the builders of the stone structures in Yucatan, the old Peruvian and other South-American nations, etc., were races distinct from the North-American Indians; and there have been many variations from these theories.

The fact is, we do not know who the Indians are, or who were the old builders of Palenque, of Uxmal, of Tiahuanuco, and numerous other old cities from Mexico to the eastern side of the Andes in South America. Until we awake to the fact that America has an interesting past, and can arouse ourselves to the effort of making out the ancestors and descendants of all these peoples, who have left us such marked differences in their architecture, their works of art, their customs and their languages, we act the part of amateurs, when from a little knowledge of a few of these different conditions, and from superficial or very general resemblances, we draw hasty conclusions. Only the most thorough explorations, conducted by men who have broad views and careful methods of work, — men who are above being led by theories to be maintained; who will look at facts in the same manner as a geologist or a biologist looks at his facts, letting them lead him where they will, — will solve for us the great problems of American archeology. The days of collectors of curiosities and hasty writers are over. Archeology is a science, and no longer in the hands of the mercenary dealer and the equally avaricious collector of curiosities. Give the proper institutions the support they ask for, and the near future will bring valuable results.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Gyration of a vibrating pendulum.

IF a body move in any curve about any centre of curvature, the inertia of the body is manifested as a force acting in the plane of the curve, and in a direction opposite to that of the centre of curvature; and if v denote the lineal velocity of the body, and ρ its distance from the centre of curvature, the force thus manifested will be represented by $\frac{v^2}{\rho}$, and is called the centrifugal force due the motion.

If the body move in a straight line on a limited portion of the earth's surface while the earth is rotating on its polar axis, its motion may be regarded, without sensible error, as being on a tangent plane; and because any tangent plane rotates about an axis